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Educational Research Bulletin
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Formulating Objectives for Tests

By RALPH W. TYLER

The current literature on constructing examinations deals almost wholly with questions concerning the form of the examination. This is an unfortunate emphasis, for the problem of first concern to teachers is to obtain tests which really show how well the students are progressing in their school work. Hence, a satisfactory test or examination must first be one which actually gives us evidence of the amount of progress which students are making.

What constitutes progress in school work? It is certainly true that every change which takes place in a student during the time he is in school cannot be considered progress. During that time he may grow taller, he may get fatter, he may acquire a new slang vocabulary, his voice may change, but we do not consider these as evidences of progress in his school work. Each subject which is taught is offered with the expectation that each student who takes it will undergo certain desired changes as the result of the course. In algebra, for example, it is expected that students will acquire a certain understanding of the meaning of abstract numbers, and that they will become somewhat skillful in solving numerical problems. These changes which we expect to take place in the student are the objectives of the subject. It is apparent that a satisfactory test in algebra is one which shows us the degree to which students are reaching these objectives; that is, the degree to which they have acquired an understanding of the meaning of abstract number, and the degree to which they have become skillful in solving numerical problems.

In similar fashion every subject offered involves certain objectives which we hope students will reach as the result of instruction in this subject. A satisfactory test or examination in any subject is an instrument which gives us evidence of the

degree to which students are reaching the objectives of the subject. One major defect of typical examinations has been the fact that these examinations have given evidence with reference to only a limited number of objectives and have not been adequately indicating the degree to which students are attaining all of the important goals which instructors are trying to reach in a given subject.

The importance of covering all of the significant objectives in a total examination program can best be shown by illustration. In chemistry the objectives which instructors are commonly trying to reach include teaching students: to acquire a fund of important facts and principles, to understand the technical terms commonly appearing in chemical publications, to be able to apply important chemical principles to appropriate situations, to express chemical reactions by means of equations involving chemical symbols and formulas, and to be skillful in certain laboratory techniques. Any adequate examination program for chemistry will provide means for discovering how far each of these objectives are being attained. Tests need to be included which will indicate how well students are acquiring these important facts and principles, how well they understand the technical terms commonly appearing in chemical publications, how able they are to apply important chemical principles to appropriate situations, how satisfactorily they can express chemical reactions by the use of equations, and how skillful they are in the essential laboratory techniques. Obviously, evidence of all of these attainments cannot be had from a single examination, but an inclusive examination program should cover all of the important objectives. Some of these attainments can be determined by means of paper-and-pencil tests with which everyone is more or less familiar. Others would need to be tested by different devices. To discover how skillful the students have become in the essential laboratory techniques it is probably necessary to set the students at work on certain laboratory problems and to evaluate their skill by means of observation and by checking the outcome of the laboratory exercises.

The variety of examinations necessitated by a variety of objectives may also be illustrated in the subject of English. Without attempting to list all of the objectives which English teachers consider important it is probable that among these

would be included teaching students: to use correct English, to write effectively, to be familiar with significant literature, to be able to evaluate various types of literary productions, and to appreciate good literature. A satisfactory program of examinations in English will therefore include tests which reveal the student's ability to use correct English, his ability to write effectively, his familiarity with significant literature, his skill in evaluating literary productions, and how well he has learned to appreciate good literature. This means again that the examination program involves a variety of testing techniques. Skill in written composition can be judged by the use of paper-and-pencil tests; the use of correct oral English may need to be evaluated by a different device. To discover how well they have learned to appreciate good literature would probably require still other devices, as, for example, one which would indicate the literary preferences of students.

These subjects are but illustrations of the situation prevailing in every field. Because of the importance of having an examination program which gives evidence of the degree to which students are reaching each of the significant objectives of the subject an essential step in planning an examination program is to formulate in a clear and understandable fashion the important objectives which the instructor is trying to reach. This formulation then becomes the comprehensive plan against which the various tests are checked to be sure that the total examination program includes devices for determining the degree to which students are attaining each of these objectives.

Two problems are usually involved in formulating the objectives of a particular course. One is to get a list of objectives which is reasonably complete; that is, which includes all of the important objectives to be reached. The other is to state the objectives in such clear and definite terms that they can serve as guides in the making of the examination questions. Many statements of objectives are so vague and nebulous that, although they may sound well, they prove to be glittering generalities which are of little value as guides in teaching and useless in making examinations.

In making a list of objectives for a course, one procedure

commonly followed is to begin with the general function or purpose of the subject and to analyze this into its several aspects or subfunctions. Another method is to begin with the content of the course and with reference to each topic ask the questions: What is the purpose of this topic? What do I expect students to get from this topic? In most cases it is necessary to use a combination of both procedures in order to get a relatively complete list of important objectives and in order to clarify the meaning of each objective. The validation of these functions and of the course content is an important step in curriculum construction but is not treated here since it is assumed that this curriculum problem has been attacked before beginning to build examinations.

This combination of methods can be illustrated by the procedures followed by the Department of Zoölogy in Ohio State University in formulating the objectives for the elementary course. This Department recognized two major functions or purposes of the elementary course. One of these was to teach the student a fund of important zoölogical information; the other was to teach the student to use scientific method in zoölogy. Beginning with these accepted major functions the instructors in the Department first analyzed these into several subfunctions; that is, they broke up the general objectives into the several more definite objectives which these general objectives included. Upon analysis the fund of important zoölogical information was subdivided into recalling important specific facts, remembering general zoölogical principles, and recognizing the meaning of common technical terms found in zoölogical publications. The use of scientific method, the instructors decided, meant the ability to formulate reasonable generalizations from experimental data, the ability to plan satisfactory experiments to test promising hypotheses in zoölogy, and the ability to apply significant zoölogical principles to situations new to the students. By means of an analysis of the two general objectives the department was thus able to formulate these six more definite objectives.

To check the completeness of these six objectives the instructors then took up, topic by topic, the content of the elementary course, asking themselves in connection with each topic what they expected students to get from the topic.

In most cases the answers to these questions represented objectives already obtained by the method of analysis; however, in examining the topics dealing with the structures of a frog which were studied by means of dissection, the instructors decided that one of the purposes of this laboratory work was to teach the students to make certain typical dissections. In examining the laboratory units involving microscopic work they decided that one of the things which the student should get from these units was skill in the use of the microscope. Hence, they added another major objective to the list, namely, skill in the laboratory techniques of dissection and use of the microscope. In going over these laboratory units another purpose which appeared to be significant was to teach students to report the results of their experiments in effective English. In examining topics in the course involving library reading another purpose was to teach students to be familiar with sources of information on zoölogical problems. The final list of important objectives accepted by the Department of Zoölogy for its elementary course included the six in the original list and the three additions obtained by checking the content of the course. Thus, by a combination of procedures, going both from the major functions by means of analysis to the more definite objectives involved, and going from the specific content of the course back to the purposes for which this content was used, a list of objectives was obtained which serves to guide the Department in formulating its program of examinations. By various means throughout the course an effort is made to get evidence of the degree to which the students are reaching each of these nine major objectives.

IN ORDER to make a list of major objectives usable in building examinations further analysis is also necessary. Each objective must be defined in terms which clarify the kind of behaviour which the course should help to develop among the students; that is to say, a statement is needed which explains the meaning of the objective by describing the reactions we can expect of persons who have reached the objective. This helps to make clear how one can tell when the objective is being attained since those who are reaching the objective will be characterized by the behaviour specified in this analysis. Behaviour is here used in the broad sense to mean any sort of

appropriate reactions of students, mental, physical, emotional, and the like. For example, in the case of the objectives for the zoölogy course, the first one was to teach students to recall important specific facts. This objective was analyzed by defining the behaviour expected of students who are reaching the objective in the following terms: To remember and state these facts without having to look them up at the time, and to recognize misconceptions which are commonly mistaken for zoölogical facts. The analysis of this objective also required a definite statement of what the important zoölogical facts are which students are expected to remember and what are the misconceptions which are often mistaken for zoölogical facts.

Similarly, in analyzing the second objective, remembering general zoölogical principles, the behaviour expected was defined as the ability to remember and state these principles without having to look them up at the time, and to recognize misconceptions which are commonly mistaken for zoölogical principles. The analysis of this objective also required a formulation of the list of general zoölogical principles which students are expected to remember. The third objective was defined as the ability to formulate an appropriate definition or description of the common technical terms in zoölogy. A collection was then made of the common technical terms which students should be able to understand. For each term, a statement was made of the sort of definition or description which would be expected from elementary students. This was necessary since some terms were so complex that only certain ideas about them would be understood by elementary students, while for other terms a very exact definition would be expected.

The fourth objective was defined as the ability to formulate in his own words as complete a generalization as is justified by the data presented, when the student is given the results of a zoölogical experiment. As a further step in the analysis it was necessary to collect typical experiments which were new to the students yet which they should be able to interpret in this way. The experiments should be new to the students so that they cannot depend upon their memory of the interpretations which have been made by others.

In analyzing the fifth objective it was defined as the ability to determine what facts would need to be established in order

to substantiate a given hypothesis and the ability to plan an experiment to establish or disprove these facts. A list was then made of hypotheses new to the student and yet for which they should be able to plan satisfactory experiments. It was necessary to have hypotheses which were new to the students so that they could not depend upon their memory of the experiments proposed by others to test these hypotheses.

The sixth objective was defined as the ability to predict the outcome of a situation involving one or more of the zoölogical principles included in the course and the ability to use these principles in explaining why this outcome could be expected. The analysis also required the collection of situations new to the students which would give them a chance to apply the important zoölogical principles taught in the course and previously formulated in connection with the second objective. The situations should be new to the students so that they cannot depend upon their memory of the explanations made by others.

For the seventh objective, skill in certain significant laboratory techniques, it was necessary to list the types of dissections which students should be able to make, the kinds of microscopic mounts which they should be able to prepare, and typical objects which they should be able to find under a microscope. For the eighth objective, the ability to report the results of experiments in effective English, specifications were drawn up to guide the instructors in their evaluation of the English used by the students in writing up their experiments. The ninth objective was defined as the ability to state the sources which were most likely to give dependable information on specific kinds of zoölogical problems. A list was made of the sources of information with which elementary students should be familiar and the types of zoölogical problems in connection with which they would be expected to consult the sources of information.

When these definitions of objectives in terms of behaviour have been formulated, and the necessary lists of facts, principles, terms, experiments, and the like have been made, the instructors have all of the basic material which they need in constructing examinations to cover the major objectives of the zoölogy course. Some time is required to collect these

basic materials, but when they have been assembled they serve as a reservoir for making new examinations and ultimately save a great deal of time. Furthermore, many of these lists are helpful means of checking the content of the course and are useful as guides in preparing lectures, planning laboratory work, and in outlining other class assignments.

Many subjects, especially the sciences, are constantly changing with the discovery of new facts and principles. Hence, it is necessary to prevent the reservoir of basic materials from becoming static, thus crystallizing what ought to be a developing course. It is, therefore, desirable to provide for an annual review of each of the basic lists by instructors in the department. As each list is examined, items are deleted which have been rendered obsolete by the new developments in the field, and other items are added to cover these new developments. The revision requires relatively little time and helps to insure a continuously appropriate set of materials from which examinations may be quickly made.

This illustration taken from the work in zoölogy is suggestive of the value of formulating and analyzing the objectives of a course in order to make examinations which are satisfactory and relatively complete. Similar procedures can be appropriately used in other fields of subject-matter. In a foreign-language course, for example, the objectives might include the ability to comprehend the meaning of selections written in the foreign language; the ability to understand oral expression in the foreign language; the ability to pronounce orally words, sentences, and paragraphs in the foreign language; the ability to compose effective written expression in the foreign language; the ability to compose effective oral expression in the foreign language; knowledge of the grammar of the foreign language; an understanding of the important vocabulary in the foreign language; and a knowledge of the art, literature, and customs of the people whose language is being studied.

In analyzing the first objective, the nature of the reading ability could be defined, and a collection could be made of selections written in the foreign language which are new to the students and which they should be able to comprehend. This collection would serve to define the kinds of reading material

to be covered in the examinations in terms of narratives, expositions, descriptions, and the like. In making the collection, care should be exercised to have an appropriate vocabulary included and to obtain selections involving ideas of the appropriate difficulty for the class. To analyze the ability to understand oral expression the objective could be defined in terms of the behaviour which characterizes understanding of oral expression, a statement of the kinds of oral expression which students are expected to understand could be formulated, and a collection made of examples which are of the appropriate difficulty. In analyzing the ability to pronounce orally a statement could be made of the kinds of material which the students should be able to pronounce fluently, and a collection made of typical words, sentences, and paragraphs which involve the variety of pronunciation skills which the students are expected to acquire.

The analysis of the ability to compose effective written expression in the foreign language could include a statement of the kinds of expression which the students are expected to compose, a collection of typical examination projects which would require these kinds of written compositions, and a statement of the specifications to be used in evaluating these compositions. The complete list of projects should include all of the various kinds of compositions which the students are expected to make. Each examination project should make clear the nature of the compositions to be written by stating the purpose which the writer needs to keep in mind and the type of readers for whom the composition is to be written. For example, one such project might be to compose a description of an American high school to be prepared for French students who have no acquaintance with any American schools. Correspondingly, the analysis of the ability to compose effective oral expression could include a statement of the kinds of oral expression which the students are expected to use and a collection of examination projects which would require the students to make these oral compositions. In analyzing the grammar objective, the kinds of behaviour which represent an understanding of grammar could be defined, a statement could be made of the grammatical principles which the students are expected to understand, and a collection could be made of typical situations in which these

grammatical principles are involved. The analysis of the objective concerned with an understanding of the important vocabulary could include a statement of the behaviour which characterizes understanding of vocabulary, and a list could be made of the important words, terms, and idiomatic expressions which the students are expected to understand. In analyzing the objective of knowledge of the art, literature, and customs of the people, the sort of behaviour which shows whether or not the student has this knowledge could be defined, and a list could be made of the kinds of art, the characteristics of the literature, and the particular customs which the students are expected to know. By carrying through these analyses of the objectives of the foreign-language course, these basic materials are obtained from which examinations can easily be made. It is readily apparent that the procedures of formulating and analyzing the major objectives are desirable for any course and are invaluable when making a comprehensive program of examinations.

These illustrations demonstrate the fact that the first steps in examination building are those involved in determining objectives. It is usually necessary to consider first the major functions or purposes of the course, breaking those up into several more definite major objectives. To make this list of major objectives more nearly complete, the content of the course is then examined, topic by topic, to discover why the topic has been included in the course; that is, to state the things which students are expected to gain from studying the topic. This examination of individual topics usually suggests additions to the list of major objectives. The purpose of these steps is to obtain a relatively complete list of the most important objectives. After the list has been formulated, an analysis is then made of each objective to give it definite meaning by defining it in terms of the behaviour expected of students, and to obtain a comprehensive statement of the specific elements involved in the objective. This analysis provides the basic material from which a complete program of examinations may be constructed. Finally, a plan of periodic review and revision of these basic materials prevents crystallization of the course and of the examinations. [Vol. XII, No. 8]

Legislation Affecting Weak School Districts

By D. H. SUTTON

The Ordinance of 1787 providing for the government of the Northwest Territory established the principle in Ohio that "schools and the means of education" should forever be encouraged. The constitution adopted in 1802 reiterated this principle and made the demand upon subsequent legislative bodies to encourage education "with laws not inconsistent with the rights of conscience." The second state constitution, and the only other one ever adopted in Ohio, followed a more direct phraseology in regard to the demand for education when it provided that "the General Assembly shall make such provisions, by taxation or otherwise, as, with the income arising from the school trust fund, will secure a thorough and efficient system of common schools throughout the State." The language of this constitutional provision is significant. It furnished the basis upon which the present plan of financing public education in Ohio has been constructed.

Pursuant to this constitutional mandate, the Legislature of Ohio embarked upon the policy of extending supplementary aid to those school areas of the state which were unable through their own resources to finance an acceptable system of public schools. Certain statutory requirements were established whereby those complying districts were entitled to receive supplementary state funds. As existing financial conditions demanded, more and more districts complied with the statutory regulations, and the funds necessary to liquidate the obligation of the state increased in amount.

During the period from 1922 to 1930, the cost per pupil in all school districts of the state increased perceptibly. This provided another source of increased financial need and further added to the burden of the state in meeting the obligation for state aid. It should be remembered that the increased cost of education in all districts of the state during the period from 1922 to 1930 was not entirely due to the influences and desires of school officials. Many factors contributed to this increase. The costs of all governmental services expanded materially.

The local subdivisions passed through a period which may properly be termed a "spending orgy" for all services of government. Data on file in the state department of education show that the per-pupil costs for the current expenditures of school operation for all districts in the state increased from $74.24 per pupil in the school year 1921–22 to $87.38 per pupil in average daily attendance in 1930–31. During the school year 1931–32 the comparable expenditure declined to $77.65, and incomplete returns from the districts for the school year 1932–33 indicate that the per-pupil costs for the current operation of schools shall not exceed $64. These data include not only the state-aid but also the more wealthy districts; hence, they would be much higher than the per-pupil costs in the areas participating in the educational-equalization fund.

While the state remained prosperous, the financial obligation for aid to the weak school districts was not unduly burdensome, but the recent economic disturbance produced a radically different situation. The number of state-aid districts increased from 641 in 1930 to 812 in 1933. Mere expansion in the number of districts is scarcely an indication of the added financial burden. The new districts participating in state aid were much more populous; hence they have required more money to finance their schools. Until this year, the Legislature had not been lax in meeting its obligations to school districts less favored financially. Today a different situation prevails.

When the Ninetieth General Assembly met in January, 1933, the outstanding obligations for the current costs of school operation in the weak districts were approximately $3,500,000. The additional amount of funds necessary to maintain the schools until January 1, 1934, under the present law was estimated to be $6,361,300. This sum, in fact, was $2,000,000 less than a literal compliance with existing laws would indicate as the necessary amount for school operation. Had this budget been adopted by the Legislature, the state-aid districts could have operated their schools, but they would have been forced to make drastic economies and severe retrenchments in order to maintain their school programs until January 1, 1934.

The total outstanding obligations prior to January 1, 1933, and restricted needs for current school costs until January 1,

1934, were $9,861,000 when the Ninetieth General Assembly convened in regular session. These financial conditions were presented to the Legislature in both the regular and extraordinary sessions. Such action as has been taken toward meeting these obligations cannot be excused because of insufficient knowledge, nor can the failure of the Ninetieth General Assembly to provide adequate revenues for a foundation school program in weak school districts be condoned on the ground that data showing the existing financial conditions were not made available.

The first action taken by the Ninetieth General Assembly whereby funds could be provided to defray existing obligations for current school costs prior to January 1, 1933, was contained in an act which provided that local boards of education in state-aid districts could borrow money and issue notes therefor in an amount not to exceed the amount due and payable to such district from the educational-equalization fund prior to January 1, 1933.[1] All of the notes issued under the authority of this act were to bear interest at the rate of 5 per cent annually and were to be due and payable on or before January 1, 1934. All notes issued under this act were to be retired from moneys accruing to the educational-equalization fund. They were not obligations against the taxable wealth of the school district issuing and selling such notes. The language of the bill is significant. It states that

> there is hereby appropriated out of any moneys now or hereafter in the state educational equalization fund such sums as shall be necessary for the payment of the principal and interest of the notes herein authorized. Provided that the total amounts of payments of state aid out of the educational equalization fund under laws heretofore in effect shall be diminished to the extent of the payments out of the educational equalization fund made under the provisions of this act; and that there shall be no payments or transfers to the educational equalization fund from the general revenue fund for the purpose of providing the amounts of money paid under this act.[2]

Local boards of education in state-aid districts availed themselves of this opportunity to pay the outstanding obligations to which they were entitled from the state educational-equalization fund prior to January 1, 1933. Of course, all accrued deficits were not liquidated, but the authorization to borrow in anticipation of revenues accruing to the equalization

[1]Amended Senate Bill No. 152.
[2]Sec. 9 of Amended Senate Bill No. 152.

fund materially aided the districts to defray the current operating expenses which were due and payable. Deficits existed and still prevail in many areas because of delinquent taxes and school funds on deposit in closed banks.

The issuance and sale of the notes under Amended Senate Bill No. 152 obligated the entire revenue resources accruing to the state equalization fund for the year 1933. The only revenues accruing for state-aid were those arising from the tax levied on cigarettes. This tax source was made available for aid to weak school districts under Section 5894–2 of the *General Code*. Under authority of this section the cigarette tax was allocated to the state educational-equalization fund.

Not long after these notes were issued, the obligation of the state for aid to weak districts for the last half of the school year 1932–33 became due. While the General Assembly was still in regular session, it made provision for this deficit by enacting another law whereby local boards of education were authorized to sell notes, the security for which was to be the cigarette tax levied and collected for the year 1934.[3] The provisions of Amended Senate Bill No. 412 enacted on July 1, 1933, were the same as those contained in Amended Senate Bill No. 152 except that the notes represented the redemption for obligations from the state educational-equalization fund accruing between January 1 and June 30, 1933, and that all notes so issued were payable on or before July 1, 1934.

The financial results of the enactment of these two measures may be summarized briefly as follows:

1. All state obligations to local school districts from the educational-equalization fund outstanding on December 31, 1932, and contracted between January 1 and July 1, 1933, were redeemed.
2. All revenues accruing to the state educational-equalization fund were obligated for eighteen months in advance of their collection.
3. All notes issued under the authority of Amended Senate Bill No. 412 became due and payable not later than July 1, 1934, which meant that only one half-year's collection of the tax levied under Section 5894–2 of the *General Code* could be applied to the amortization of the notes so issued.

Thus far the General Assembly had made provision for educational equalization only to the extent of allocating future tax collections for the payment of obligations already incurred. No program had been enacted whereby such areas could expect

[3]Under the authority of Sec. 5894–2 of the *General Code*.

to receive any revenues to meet the current costs of school operation for the school year 1933–34. This problem remained as an immediate exigency. In attempting to meet the financial obligations for state aid an amendment to the General Appropriation Bill was adopted, but no revenue was provided. That part applying to educational equalization reads:

> To each school district applying for participation in the state educational equalization fund, there shall be credited toward the eight mills levy required for participation in the said fund at least three mills or the estimated number of mills upon the duplicate thereof that would be necessary to produce a sum equal to all funds received by said district except those arising from the tax rate applied to the general and classified property lists thereof. Upon application of the director of education or the board of education of the said district to the state tax commission, on or before the fifteenth of July of any year, the said tax commission shall make an estimate of the probable number of mills of tax credit that would accrue to the said district in accordance herewith and shall certify the same to the director of education and to the said district not later than the fifteenth of October of the said year. The said district is hereby authorized to reduce the eight mills levy by at least three mills and by such an amount greater than three mills as may be certified by the tax commission.[4]

This amendment applied only to those districts participating in the educational-equalization fund. It seems obvious that in preparing the amendment little time or attention was given to the practical results which would ensue provided the law became effective. Under this amendment each district participating in equalization aid was required to levy at least 8 mills upon the taxable wealth of the district to defray the current cost of operating schools for the year in question. But this levy in the school district was to be decreased by 3 mills "or the estimated number of mills upon the duplicate thereof that would be necessary to produce a sum equal to all funds received by said district except those funds arising out of the tax rate of the said district applied to the general and classified property lists thereof." Therein was the difficulty. No doubt the intention of the members of the Legislature was a laudable one, namely, presuming that they wished to decrease the tax burden. Their action, however, surpassed even their most liberal expectations. Instead of providing tax relief in a commendable degree, the amendment made it impossible for local officials in state-aid districts to

[4] *See* Biennial Appropriation House Bill No. 699. Department of Education, 1933–34.

operate their schools during such time as this amendment remained in the statutes.

By providing that all the non-tax revenues accruing to a school district should be reflected in tax relief, the Legislature deprived the state-aid districts of all assets which they had enjoyed during the previous years for current operating expenses in addition to the 8-mill rate levied on the tax duplicate. All of the revenues accruing to the local districts from the irreducible debt fund, the depository school land fund, the state public-school fund, the intangible revenues, the sale of bonds and notes, the educational-equalization fund, the interest accruing on all funds held by the board of education, the tuition of non-resident pupils, the funds received from liquidated banks, and all refunds and similar sources of revenue not arising from a tax on the general and classified property lists of the districts were summarily deducted from the financial resources of the state-aid districts through the provisions of this amendment.

PERHAPS the meaning will be clearer if an example is offered. Suppose that District A in one of the state-aid counties had during the school year 1932–33 a total of $24,000 in non-tax revenues from the following sources: educational equalization, $12,000; irreducible debt fund, $1,000; depository school land fund, $500; return from a liquidated bank, $5,000; tuition, $5,300, and interest from depository school funds of $200. The tax duplicate of District A was $3,000,000, and the levy for current operating expense was 8 mills for the school year 1932–33. The total available revenue of this district to meet the current costs of operating schools in 1932–33 was $48,000. During the school year 1933–34, under the amendment District A would have had only $24,000 available with which to operate its schools. If the non-tax revenues of the district were divided by the tax duplicate, the computed millage by which the 8-mill levy must be reduced would be exactly 8 mills. When the current levy was reduced by the required amount, the district could levy exactly nothing to defray the cost of school support. A counterpart of this example could be found in any one of the many districts participating in state aid.

This illustration represents what would have happened in

the majority of the 812 school districts which received aid in 1932–33. There are many localities that have heretofore received approximately fifty per cent of the money spent for public education from the educational-equalization fund. Such districts would immediately lose the full amount of their taxing power. The Legislature in regular session agreed to this amendment in the rush to complete their task; hence, several important items were overlooked. If it was the intention of the legislators to provide tax relief in such areas, they did so almost with a vengeance.

The difficulties existing in the laws relating to state-aid districts as enacted by the Ninetieth General Assembly in regular session may be briefly stated as follows:

1. Only sufficient funds were provided to care for the deficits in state aid incurred prior to July 1, 1933.
2. All revenues accruing to the state educational-equalization fund were obligated until January 1, 1935, for the payment of notes issued under the authority of Amended Senate Bill No. 152 and Amended Senate Bill No. 412.
3. Any funds subsequently accruing to the state educational-equalization fund were required to be expended for the retirement of all outstanding notes whether such obligations were due or not.
4. All non-tax resources accruing to the support of public schools in state-aid districts were required to be reflected in tax relief.
5. No revenues were available in the state educational-equalization fund for the payment of the current costs of school operation in state-aid districts for the school year 1933–34.

These five difficulties were the major ones faced by the extraordinary session of the Ninetieth General Assembly when the Governor issued his call and delivered his message on schools on August 22. Some of these exigencies were met. Others still remain to be solved.

IN ORDER to relieve the educational-equalization fund and secure the notes issued under the authority of Amended Senate Bill No. 152 and Amended Senate Bill No. 412 the extraordinary session of the Ninetieth General Assembly enacted two laws. The first, Substitute Senate Bill No. 26 amended Section 4 of Amended Senate Bill No. 152 by providing that all notes issued under the authority of this act should be redeemed and paid prior to January 1, 1934. In addition, the entire collection of the tax levied under the authority of Section 5894–2 of the *General Code* for the year

1933 and credited to the educational-equalization fund was made the security for all notes issued pursuant to the authority of Amended Senate Bill No. 412, but all revenues remaining after the notes and the interest obligations were paid should become immediately available to defray the current costs of school operation in the state-aid districts. The second, a companion bill, obligated the entire tax collection levied under Section 5894–2 of the *General Code* during the year 1934 for the payment of the notes issued under the authority of Amended Senate Bill No. 412.[5] The maturity of the notes so issued was extended until January 1, 1935, and the remaining revenues after the notes and interest costs were paid becomes immediately available to pay state aid to weak school districts.

These two acts provided security for all outstanding notes. Moreover, they freed any revenues not needed to pay these obligations together with all other moneys accruing to the educational-equalization fund for the current costs of operating schools in the state-aid districts.

The next action of the extraordinary session of the Ninetieth General Assembly repealed the amendment written into House Bill No. 699 during the regular session.[6] By this act, state-aid districts were enabled to fix their budgets and determine their tax levies for current operation during the school year 1933–34.

As a result of the measures enacted by the extraordinary session all of the existing difficulties except one were remedied. Certainly, this one is important. No revenues were provided to meet the obligation of the state to weak school districts for the year 1933–34. Practically all revenues accruing to the educational-equalization fund from Section 5894–2 of the *General Code* until January 1, 1935, will be necessary to meet obligations already incurred. No other revenue resources were provided to defray current school costs in state-aid districts except the residue remaining from the cigarette tax after all notes and interest payments have been met. These remaining revenues shall scarcely exceed $300,000 per year, which amount is less than one-tenth of the sum necessary to provide even the most meager school program in the districts eligible to participate in the educational-equalization fund.

[*Continued on page 224*]

[5]Amended Senate Bill No. 25.
[6]Senate Bill No. 28.

EDITORIAL COMMENT

Practical Research

THESE difficult days demand intelligent thinking by school people quite above the ordinary level that has been maintained in the last decade. Lessened financial support has compelled the schools to eliminate courses from the curriculum, decreased the conventional time allowed for studies, combined extra-curricular activities, increased the duties of teachers, shortened the school terms, and made many other changes of far-reaching consequence.

The new patterns of thinking symbolized by "the new deal" have introduced a ferment into the old mass of educational practice. Conflicts between points of view and uncertainties about plans are symptomatic of conditions in which the accepted practices of yesterday will not automatically work in solving the problems of today. New programs must be developed; novel procedures must be invented; fresh points of view must be adopted; untried plans must be initiated; and unbeaten paths must be explored. This means for school people that, to an extraordinary degree, investigation and research are needed to meet the present situation.

When the layman thinks of research, he assumes that it requires leisure and money. He supposes that trained people must be taken off production and given appropriations in the budget for studying problems of greater or less importance. Such assumptions lead him to decide that in these times of straitened finances research should be eliminated along with other luxuries.

Research, however, is merely careful investigation and orderly thinking, and as such it is more useful in times of stress than under easier circumstances. Intensive thinking is necessary to make ends meet; facts must be collected if wise decisions are to be made; the best judgment of experienced people must be co-ordinated; and accepted policies and methods must be tested for effectiveness. Not fewer investigations but more are demanded by a businesslike administration.

Fortunately, research is an attitude rather than a matter of leisure and money. If an administrator wants to have his

problems studied, he can arrange for it whether he has money or not. The central factor is a scientific point of view. If he has that, he will find the ways and the means of utilizing his teaching corps and his administrative staff to procure the information he needs, and negligible will be the cost for postage, pamphlets, books, and an occasional bit of stenographic work for which the regular staff cannot care.

Practical research, careful study, or vigorous investigation, by whatever name it is called, is a normal attachment to the solution of all practical problems. By its use seasoned decisions are substituted for snap judgments by the administrator. Having more data to depend upon and the experience of other people to assist him, his decisions are thereby more solidly placed. The amount of time and money he spends upon a problem is largely dependent upon the amount he has available.

The school administrator has at his command a reserve of assistance that is unusually responsive. Teachers do not resent their use in devising new plans. They appreciate the opportunity to use their brains in surmounting difficulties. They like to be selected to work upon committees which they believe to be important. Membership on special committees dealing with crucial problems and assignments to special tasks are excellent agencies for raising morale in the teaching corps. Teachers love to study methods of improving their school activities.

It is logical, therefore, to expect that many superintendents who have not felt the need for practical research will, in these years of depression, set up informal agencies to study crucial problems, and they may even formalize the procedure by establishing a central committee on practical research which will arrange studies and co-ordinate research activities.

W.W.C.

READINGS

WILLIAMS, L. A. "Analysis Techniques in Curriculum-Making," *School Review*, XLI (June, 1933), pp. 437–42.

Four analysis techniques, "job," "activity," "functional," and "content," are discussed in outline form under the following headings: Criteria by which to decide when this type of analysis should be used, Steps to follow, Techniques to be employed, and Terms to be understood.

OLANDER, HERBERT T. "The Need for Diagnostic Testing," *Elementary School Journal*, XXXIII (June, 1933), pp. 736–45.

This interesting study calls attention to the manner in which the answer to an arithmetic example is reached and shows the impossibility of inferring the child's mental processes from his written work. Forty teachers were asked to score papers for children tested with the Buswell-John Diagnostic Test for Fundamental Processes in Arithmetic, and the average score was 70.8. Then the teachers were asked to rescore the tests when given the child's oral statement of his mental processes while working the example, and the average score was 64.2. From this the author concludes that: "Teachers, rightly so or not, permit pupils' methods of solving arithmetic examples to influence the marks given." The teachers were also asked to indicate the errors that they inferred each child had made from an examination of his test paper only. The comparison of the teachers' inferences and the actual errors furnish interesting and enlightening reading.

JUDD, CHARLES H. "The Scientific Development and Evaluation of the Curriculum," *Elementary School Journal*, XXXIII (April, 1933), pp. 577–91.

In this article Mr. Judd forcefully presents a method of curriculum reorganization which avoids excessive emphasis on logically organized subject-matter, on the one hand, and opportunistic dependence on pupil impulse, on the other. It is neither subject centered nor child centered. Instead, it is a curriculum which is concerned with the relations of the growing child to our modern society. The article is worthy of re-reading several times.

RICHARDSON, M. W., AND KUDER, G. F. "Making a Rating Scale That Measures," *Personnel Journal*, XII (June, 1933), pp. 36–40.

This article describes the construction of a device for rating salesmen using the principles of psychophysics. Usually graphic rating scales have been used. Two objections to graphic scales were that it was difficult to obtain reliable ratings and that they did not give a concrete description of the subject rated.

The builders of this new device collected one thousand statements made by supervisors, managers, and trainers describing the behavior of salesmen on the job. After judges had placed the statements on a continuum of success on the job by the method of equal appearing intervals, a scale value for each statement was obtained. Statements spaced over the continuum

were chosen to construct two forms of the scale which were tried out, analyzed, and revised for internal consistency. The reliability of the two final forms measured in three different ways was from .83 to .90. Thus higher reliabilities were obtained than are usually found in graphic rating scales, and the scale gives a description of the salesmen's behavior which is valuable for diagnostic purposes.

GREENE, HARRY A., AND BETTS, EMMETT A. "A New Technique for the Study of Oral-Language Activities," *Elementary School Journal*, XXXIII (June, 1933), pp. 753–61.

This is the report of a comparison of five different methods of recording errors in oral composition: electric recording (using a device developed at the University of Iowa), court reporters, shorthand reporters, and phoneticians. The most complete and accurate was the electric recording by which all words spoken were recorded with 99.8–per cent accuracy, the report of the phoneticians was the next most accurate but only 17.1 per cent of the words spoken were recorded. The other reports were slightly inferior in accuracy but superior in the number recorded to that of the phoneticians. The recording device may be placed in a classroom and be entirely hidden if necessary. The report is made on a dictaphone cylinder so it may be kept permanently, or it may be shaved and re-used.

In Paper Covers

GRAVES, FRANK P., AND GRAVES, MARK. *Report to Governor Franklin D. Roosevelt of an Analysis of Appropriations for and Expenditures by the Department of Education.* Albany, New York: University of the State of New York, 1932. 64 pp.

Two things in particular stand out in this report: the first, the wide scope of the activities of the New York State Education Department, and the second, the rapid increase in state support for public education. Among the responsibilities of the Department are the licensing of professions such as medical, dental, and nursing; the control of the training and licensing of teachers; the approval of all plans for new school buildings except in the large cities; rehabilitation of the physically handicapped; scholarships to state institutions; control and operation of the state museum and state library. The extent to which the principle of state support has been accepted in New York is shown by the fact that in 1921–22 slightly less than $35,000,000 was expended for the support of public schools, which amount in 1930–31 had increased to approximately $97,000,000.

T. C. HOLY

ALEXANDER, CARTER, AND COVERT, TIMON. *Bibliography on School Finance, 1923–1931.* Washington: Government Printing Office, 1932. x+343 pp. (United States Office of Education Bulletin, 1932, No. 15)

This bibliography, prepared for the National Survey of School Finance, does for the materials published in the field of school finance from 1923 to September, 1931, what the bibliography of the Educational Finance Inquiry did for the preceding years. While in some respects it is not so complete

as the earlier work, it has for all practical purposes thoroughly covered the field. The bibliography endeavors to include only materials which are in usable form and makes no effort to provide under any given head all the references which a specialist in that one field could assemble over a period of time. The arrangement and cross-indexing of materials are well done and will expedite the work of the educational executive and investigator when searching for important materials on almost any problem of educational finance.

W. E. ARNOLD

RUCKMICK, CHRISTIAN A., Editor. *University of Iowa Studies in Psychology, No. XV.* Princeton, New Jersey: Psychological Review Company, 1932. vii+303 pp. (Psychological Monographs, Vol. XLIII, No. 1)

Probably the most general single conclusion that can be drawn from the numerous studies that have come from Mr. Travis' laboratory within the past few years is that stuttering is normally but one sympton of a much more widespread bodily involvement. Seven of the nine studies reported in this volume have investigated specific dysintegrations correlated with or accompanying stuttering. As the studies are more or less specific in nature, they will appeal chiefly to clinicians and psychologists who are interested in the rather wide interrelations of stuttering and other bodily dysintegrations. The two remaining studies deal with *The Remnant Capacities of the Feeble-minded* and the *Causes of Social Maladjustment in Children.*

DAEL L. WOLFLE

HAMILTON, OTTO T., AND MURRAY, CLARENCE L. *A School Survey of LaGrange County, Indiana.* Bloomington, Indiana: Indiana University, 1931. 64 pp. (Bulletin of the Extension Division, Indiana University, Vol. XVII, No. 4)

This survey was directed by a member of the staff of the Extension Division of Indiana University assisted by the local county superintendent. The staff consisted of 14 graduate students and 43 undergraduate students who were members of two extension classes in education. The fact that so large a group of educational workers was familiarized with school-survey techniques is significant.

The survey itself is broken up into seven topics, and under each of them a vast amount of data has been reported which should be useful to the boards of education concerned. One interesting summary item states that those schools in the county which rated high in intelligence generally rated low in achievement, and vice versa.

T. C. HOLY

LOOFBOUROW, G. C. *Test Materials for Problem Behavior Tendencies in Junior High School Boys.* Berkeley, California: University of California, 1932. 62 pp. (University of California Publications in Education, Vol. 7, No. 1)

The purpose of this study was to select and validate test materials which may be used to differentiate between problem and non-problem boys in junior high schools. Three tests which proved promising in previous

studies were selected, and seven tests based upon the findings of previous experimental studies were constructed. Three criteria were chosen upon which the tests were validated. The battery of tests thus devised will distinguish between a group of problem boys and a group of non-problem boys, but it will not definitely pick out any problem boy—the problem which the teacher and school principal face.

FRED P. FRUTCHEY

SOPER, WAYNE W. *The Use of the Elementary School Auditorium in Cities and Villages under Superintendents.* Albany, New York: University of the State of New York, 1932. 64 pp. (University of the State of New York Bulletin, No. 990)

The auditorium is one of the most expensive features in the construction cost of a school building, but from the standpoint of utilization, it too frequently yields the smallest return in educational value of any part of the average school building. Many schools fail to take advantage of the great educational possibilities of the auditorium, but in this volume we are informed of the excellent results achieved in schools which do utilize it. Mr. Soper's study presents interesting statistics and information together with sane and constructive recommendations. He urges that the auditorium be used as a supplement to the classroom and furnishes abundant suggestions as to how this can be done and who should do it.

WILLIAM E. ARNOLD

SEYFRIED, J. E. *Analysis and Evaluation of New Mexico State School Laws.* Albuquerque, New Mexico: University of New Mexico, 1932. 87 pp. (University of New Mexico Bulletin, Vol. 6, No. 2)

This is a non-technical analysis of the school code of New Mexico with critical evaluations of each item. The material contained in the bulletin is rendered more valuable to the school man as well as the layman by the comments of the author regarding each section of the code. While many of these comments are empirical, they are on the whole enlightening and constructive.

WILLIAM E. ARNOLD

DAVIS, H. H. *Taxation: Its Purposes and Methods.* Columbus, Ohio: Stoneman Press, 1932. 72 pp.

This most excellent booklet of exactly six dozen pages is confined to the field of taxation and, unlike the ordinary textbook on public finance, does not treat the problems arising out of public expenditures and public debts. To the reviewer one of the greatest difficulties at the present time with regard to governmental finance is that of indebtedness. The electorate, during the last decade, voted bond issues for improvements too often in order to keep up with the Joneses in a neighboring governmental unit. Now they must be paid for and it hurts, but we cannot have our cake and eat it, too.

Mr. Davis has taken up the theories of taxation and has shown clearly the fundamental ideas underlying progressive as well as proportional rates. The chapter entitled "The Most Feathers With the Least Squawk" will give the reader an insight into the method used by most legislative bodies to

devise a tax system. Often there is a curious mixture of many theories of taxation in the laws enacted by our legislatures.

There is a short chapter discussing the overlapping of taxing units. It is pointed out that our national and state governments make it difficult to set up a very scientific system of taxation. Both the Federal Government and the various state governments often use the same taxes with little regard as to the burden on individuals and business. In many cases there are constitutional provisions which increase the difficulties. Further, we have too many taxing areas—a remnant of a horse-and-buggy economy.

Property, income, sales or consumption, business, and death taxes are given a chapter each. In all of these the reader will find illustrations to assist him in understanding how the given tax operates. While there are references at the ends of some of the chapters, they are not always well chosen, and none is given, for example, for income, sales, or death taxes.

In spite of the criticisms made this work of Mr. Davis' can be read with profit by the layman, and the reviewer believes that it should find a place in our high schools as a part of a course in citizenship, civics, history, or economics if the last named is included. It is readable, and, with our growing tax consciousness, the high school and college student will find that it will give him a basis for some sound thinking on matters of taxation.

L. EDWIN SMART

Books to Read

PLIMPTON, GEORGE A. *The Education of Shakespeare, Illustrated from the Schoolbooks in Use in His Time.* London and New York: Oxford University Press, 1933. ix+140 pp.

The author, long known as a collector of old schoolbooks, in this volume has attempted to show what the education of Shakespeare was like by an examination of the pedagogical treatises, courses of study, and school textbooks in use in his day. For this purpose Mr. Plimpton has drawn exclusively upon his own collection, which is probably the most complete in this country. The many illustrations, largely facsimile title-pages and other pages of the books discussed, constitute the most valuable feature of this work. Quotations from the books are meager and sketchy, and there is little in the way of original exposition.

R. H. ECKELBERRY

HOLT, E. B. *Animal Drives and the Learning Process.* New York: Henry Holt and Company, 1931. vii+307 pp.

This is an effort to establish psychology upon a precise physiological basis and thus to justify radical empiricism. The metaphysical motivation peeps out at every corner and is explicitly avowed. As such the book is immensely stimulating, all the more so that it is written in Mr. Holt's charming style.

But between an enormously erudite, though one-sided, physiological citation, on the one hand, and metaphysical interests, on the other, the learning process is somewhat lost sight of. Holt's physiological psychology is valuable precisely for the purpose he has in mind—for philosophy. Its

value for psychology is chiefly regulatory and negative. Physiology may set for us certain general principles within which we must work, but we must develop further principles of our own in the light of our own facts. And despite all the experimentation on human and animal learning, it now appears that we have scarcely begun the formulation of such principles. The Galileo, let alone the Newton, of psychology would seem not yet to have appeared.

HORACE B. ENGLISH

WALLER, WILLARD WALTER. *Sociology of Teaching.* New York: John Wiley and Sons, 1932. xiv+467 pp.

As a text in educational sociology, this volume has no serious rival. Original in viewpoint, suggestive in analysis, and lively in presentation, it neither insults the intelligence of teachers nor solves problems which at present are frankly insoluble. Not the least of its virtues is that it carries the student through the field of current research activities and leaves him at the frontier. Appended to each chapter is a most inviting list of projects for further study.

To Waller, educational sociology is neither an account of man's historic past, an introductory textbook in sociology incorrectly labeled, nor even a "new" philosophy of education. The first essential thing is human life in the school, the second is the reciprocal relations of school and community, and the third has to do with the effects of teaching on teachers. Nowhere has the separate culture of the school, its group forms, social processes, attitudes, and controls been better analyzed. No sociologist has handled teaching problems and teacher maladjustment with greater skill. And finally, the case studies and life histories bearing upon the interaction of school and community have not been surpassed. On the whole, this book points the way toward the type of approach in which the sociologist can be of most service to the educators.

LLOYD ALLEN COOK

BEAVER, ALMA PERRY. *Initiation of Social Contacts by Preschool Children.* New York: Teachers College, Columbia University, 1932. 65 pp. (Child Development Monographs, No. 7)

The purpose of this study, carried on at the Child Development Institute at Teachers College, Columbia University, for studying techniques in social behavior of children, is the "development of a technique for the objective recording of the factors involved in the initiation of social contacts by children of preschool age in group situations."

Thirty-two children, ranging in age from twenty-six months to forty-five months, in the two nursery-school groups were the subjects, and from 24 to 33 five-minute records per child during spontaneous play were accumulated.

The conclusions mentioned were considered tentatively by the author, because of the composition of the group, the high degree of selectivity, and limited number. The number and types of contacts varied greatly with individual children, and there is a distinct tendency for the number of contacts to increase with age. The younger children showed a tendency to use a higher percentage of material contacts in their initiations, while the older

group used a higher percentage of verbal contacts. The amount of resistance to other children was shown to be greatly diversified.

HELEN SMITH

DOBBS, ELLA VICTORIA. *First Steps in Art and Handwork.* New York: Macmillan Company, 1932. xiii+242 pp.

There are two developments in elementary education which deal with materials and manipulative experiences. Miss Dobbs represents one of these schools, namely, illustrative handwork, and the Bonser leadership represents the other, which is referred to as elementary industrial arts or elementary practical arts. The two views do not coincide, and it is difficult to understand how one of the two can be justified.

Miss Dobbs includes such chapters as "Picture Making," "Working with Clay," "Design," "Lettering," "Dramatics," and "Toy Making." Persons familiar with the Bonser view look for and find a closer unity or integration of all education and growth through more valid lifelike activities as seen in the heads: food, clothing, shelter, tools and machines, records, and utensils. These are illustrated in the curriculum by such units of work as "pioneer life," "a study of time," "how our city gets its water supply," "how man learned to write," "a Dutch study," "our terrarium."

The Dobbs approach is through more or less separate units or subjects where art is a principal feature. This is demonstrated by such headings as "paper cutting," "stick printing," "toy making," "sand-table working," "playing house"—all carried on without much attention to the integrated character of the outcome and the "lead-on" possibilities so emphasized by Dewey and Kilpatrick. The connotation "handwork" ever points to a means as an end.

The young teacher will be confused often by the similarity of manipulative experiences in the two approaches. The joker lies in one's use of newer educational criteria as a test of what is good. This is where Bonser and his school obviously excel. The critical reader of Miss Dobbs's book is led to ask: Are the activities selected from real life situations? Are they planned and developed by the individual pupil as real life experiences? What subject-matter outcomes are gained? What is learned from the viewpoint of social and economic discrimination? What further activities are stimulated? The present reviewer regrets his inability to see where Miss Dobbs's book can stand such scrutiny.

WILLIAM E. WARNER

GOODENOUGH, FLORENCE L. *Anger in Young Children.* Minneapolis, Minnesota: University of Minnesota Press, 1931. xiii+278 pp. (Institute of Child Welfare Monograph Series No. 9)

This research into the emotional behavior of small children is based upon observations of 45 children ranging in age from seven months to seven years ten months. The mothers of these children were given carefully prepared record blanks accompanied by adequate directions, and they were asked to describe each outburst of anger during a four-month period.

The records of behavior during angry outbursts gave data on the frequency and duration of the outbursts, general conditioning factors,

direct and indirect causes, and methods of control used by parents. From these data the author's deductions furnish a better basis for statements about anger than the random dicta in most books on child behavior.

The chapter of greatest general interest reports the methods used by parents to control angry outbursts, and records the effects of these various methods. Little correlation was found between the methods actually used in given situations and the methods which mothers believed they used. Some methods which they checked as never used, threatening, ridiculing, depriving of food, they did use when the anger situations appeared. This leads the author to say, "This point takes on additional significance when we recall how much reliance is placed upon parents' statements as to their manner of handling children in many of our modern organizations dealing with behavior problems" (p. 212).

Everyone who works with small children should read this book and ponder. It would be a fine thing to set about keeping a few records of everything that happens in situations where the child is having a hard time.

JESSIE A. CHARTERS

* * *

Legislation Affecting Weak School Districts

[*Continued from page 214*]

In view of these facts one may venture the observation that the state educational-equalization fund exists in name only. Unless a subsequent session of the Legislature makes some additional provision, the weak school districts can expect to receive no appreciable amount of revenue from the state during the school year 1933–34. The maintenance of even the most meager school program will devolve upon the tax-paying ability of those districts in need of aid unless some source of revenue is made available for weak school districts. At present the state-aid districts, from all sources, have approximately enough revenue to operate their schools for a period of two months.

Contrary to appearances, the Legislature did not provide a means of redeeming the obligation of the state to the children residing in state-aid districts for the ensuing school year. What a future legislative session may bring in the way of aid to school districts now in financial distress, no one knows. It would be unsafe, perhaps, to hazard even a guess. But the only relief lies in subsequent legislative action. At present the problem remains unsolved.

NEW TESTS

THE Objective Test Exercises in High School Physics, constructed by J. E. Kirkpatrick and Harry A. Greene and published by the Public School Publishing Company, are designed as handbooks from which teachers can obtain exercises for constructing examinations, and they may also be used as study exercises by the students. Five books are available, one in each of the five common topics of physics, mechanics, sound, heat, electricity, and light. Each handbook is divided into units of the main topic. The reviewer has before him the handbook on mechanics. Some of the exercises involve the application of principles of physics, while many are informational exercises. The exercises are not arranged under the different objectives of high-school physics teaching. In constructing examinations teachers must select the exercises which will yield valid reactions and show the degree to which pupils are achieving each of the important outcomes of the course.

The exercises were obtained from an analysis of seven of the more widely used high-school physics textbooks. Only concepts which are common to five or more of the textbooks were used in constructing the exercises. Each exercise is numbered so that teachers and pupils can readily refer to the key for the correct answers. The Manual states that "a pupil who can answer all of the exercises in the Handbook has an adequate knowledge of the subject of high-school physics." Teachers of physics will be interested in these exercises since commonly taught facts and principles are brought together and serve as part of the fundamental content for a course in high-school physics.

FRED P. FRUTCHEY

PRIMARY teachers have become increasingly conscious of the problem of the readiness of first-grade children to learn to read since the discussion of this question appeared in the yearbook on reading of the National Society for the Study of Education. Aside from the general belief that a variety of concrete experience, varied vocabulary, and intellectual ability are important factors in determining the ease with which children learn to read, little has been done to develop a

dependable technique for discovering the appropriate time for individual children to begin reading. An attempt to provide a useful instrument for this purpose is represented by the Reading Readiness Tests developed by M. J. Van Wagenen, of the University of Minnesota, recently published by the Educational Test Bureau, Minneapolis, Minnesota.

These are individual tests which must be given to one child at a time, the battery requiring about twenty minutes. There are two equivalent forms of the battery, each consisting of a range of information scale, a test of perception of relations, a vocabulary test, a test of memory span for ideas, a word discrimination test, and an exercise in learning foreign words. These tests were chosen for the purpose because of the positive correlation of the test results with later reading achievement of first-grade pupils and because of the relatively low intercorrelations of the six tests. In the preliminary tryouts with a group of 91 children, the correlation was .73 between the Reading Readiness Tests and the scores made by the children on a reading-achievement test given at the close of the first grade. This indicates that the tests will be useful as partial indicators of the probability of success of first-grade children in learning to read, but they do not cover all of the factors related to reading achievement. The estimated reliability of the six scales taken together is .94, which is satisfactory for individual measurement. The results are reported in C scores which make them more easily interpreted. The promising outcome of the preliminary use of these scales suggests their value for further experimentation.

R. W. TYLER